

## Claims

What is claimed is:

- 1 Sub 1. 1. A method of compiling a resultant image, the method comprising the steps  
2 of:  
3 providing a plurality of raw image data files;  
4 providing a buffer memory structure comprising at least one buffer  
5 memory pair for each raw image data file;  
6 identifying at least one pertinent segment from each of the raw image data  
7 files, the at least one pertinent segment being part of the resultant image;  
8 buffering image data corresponding to the at least one pertinent segment  
9 from each raw image data file into the at least one buffer memory pair  
10 associated with the raw image data file; and  
11 copying the at least one pertinent segment from the associated at least one  
12 buffer memory pair into a resultant image buffer.
- 1 2. The method of claim 1, wherein the step of identifying the at least one  
2 pertinent segment further comprises the steps of:  
3 ascertaining the existence of at least one overlap of a plurality of pertinent  
4 segments in the resultant image;  
5 determining for each overlap a predominating pertinent segment having  
6 precedence in the resultant image; and  
7 classifying the predominating pertinent segment as the at least one  
8 pertinent segment.

1 3. The method of claim 1, further comprising the step of permitting the at  
2 least one pertinent segment to be overwritten within the resultant image  
3 buffer by a predominating pertinent segment in accordance with an opaque  
4 ink model.

1 4. A method of imaging, the method comprising the steps of:  
2 providing a plurality of raw image data files;  
3 providing a plurality of imaging devices;  
4 providing a recording medium;  
5 providing a buffer memory structure comprising at least one buffer  
6 memory pair for each raw image data file;  
7 causing relative motion between the imaging devices and the recording  
8 medium;  
9 identifying at least one pertinent segment from each of the raw image data  
10 files, the at least one pertinent segment being part of the resultant image;  
11 buffering image data corresponding to the at least one pertinent segment  
12 from each raw image data file into the at least one buffer memory pair  
13 associated with the raw image data file;  
14 copying the at least one pertinent segment from the associated at least one  
15 buffer memory pair into a resultant image buffer; and  
16 activating the imaging devices during the relative motion and in  
17 accordance with data in the resultant image buffer, thereby applying to the  
18 recording medium a representation of the data in the resultant image  
19 buffer.

- 1 5. The method of claim 4, wherein the step of providing a buffer memory  
2 structure further comprises the steps of:  
3 defining an imaging zone for each imaging device;  
4 determining which imaging zones are required to image each raw image  
5 data file; and  
6 providing, for each raw image data file, a buffer memory pair for each  
7 required imaging zone.
- 1 6. The method of claim 5, wherein the buffering step further comprises  
2 buffering image data corresponding to the at least one pertinent segment  
3 from each raw image data file into the buffer memory pair provided for  
4 each required imaging zone.
- 1 7. The method of claim 4, wherein the step of identifying at least one  
2 pertinent segment further comprises the steps of:  
3 ascertaining the existence of at least one overlap of a plurality of pertinent  
4 segments in the resultant image;  
5 determining for each overlap a predominating pertinent segment having  
6 precedence in the resultant image; and  
7 classifying the predominating pertinent segment as the at least one  
8 pertinent segment.
- 1 8. The method of claim 4, further comprising the step of permitting the at  
2 least one pertinent segment to be overwritten within the resultant image  
3 buffer by a predominating pertinent segment in accordance with an opaque  
4 ink model.

- 1 9. An imaging apparatus comprising:
- 2 a plurality of imaging devices;
- 3 a support for a recording medium;
- 4 a device to provide relative motion between the imaging devices and the
- 5 support;
- 6 a buffer memory structure further comprising at least one buffer memory
- 7 pair;
- 8 a resultant image buffer;
- 9 a control unit in electrical communication with the buffer memory
- 10 structure and the resultant image buffer, the control unit operating so as to
- 11 copy selected portions of data in the buffer memory structure into the
- 12 resultant image buffer; and
- 13 a drive unit in electrical communication with the control unit, the resultant
- 14 image buffer and the imaging devices, the drive unit activating the imaging
- 15 devices during the relative motion and in accordance with data in the
- 16 resultant image buffer, thereby applying to the recording medium a
- 17 representation of data in the resultant image buffer.
- 1 10. The imaging apparatus of claim 9, wherein at least one of the control unit
- 2 and the drive unit further comprises a digital computer.
- 1 11. A method of image optimization, the method comprising the steps of:
- 2 providing image data;
- 3 providing a plurality of imaging devices;

4 providing a recording medium;  
5 causing relative motion between the imaging devices and the recording  
6 medium;  
7 generating a raw position signal indicative of the position of the imaging  
8 devices relative to the recording medium;  
9 defining a resolution enhancement parameter;  
10 defining an image size parameter;  
11 defining at least one offset register;  
12 defining at least one pixel prescaler responsive to the at least one offset  
13 register;  
14 generating an optimized position signal by multiplying the raw position  
15 signal by the resolution enhancement and the image size parameters and  
16 dividing by the at least one pixel prescaler; and  
17 activating the imaging devices during the relative motion in accordance  
18 with the optimized position signal and the image data, thereby applying to  
19 the recording medium an optimized representation of the image data.

1 12. An image optimization apparatus comprising:  
2 a plurality of imaging devices;  
3 a support for a recording medium;  
4 a device to provide relative motion between the imaging devices and the  
5 support;

6 a sensing system to determine the position of the imaging devices relative  
 7 to the recording medium, the sensing system further comprising a position  
 8 encoder and a phase locked loop, the position encoder generating a first  
 9 signal indicative of the position, the phase locked loop responding to (i)  
 10 the first signal, (ii) a resolution enhancement parameter and (iii) an image  
 11 size parameter so as to generate a second signal, the second signal having  
 12 a frequency determined by the resolution enhancement and image size  
 13 parameters;

14 a control unit, responsive to the sensing system and to image data; and  
 15 a drive unit in electrical communication with the control unit and the  
 16 imaging devices, the drive unit responding to at least one pixel prescaler  
 17 and selectively activating the imaging devices during the relative motion at  
 18 locations corresponding to the image data, thereby applying to the  
 19 recording medium an optimized representation of the image data.

1 13. The image optimization apparatus of claim 12, wherein the position  
 2 encoder further comprises an angular position encoder.

1 14. The image optimization apparatus of claim 12, wherein the second signal  
 2 indicates successive imaging positions and reflects multiplication of the  
 3 first signal by the resolution enhancement parameter, the second signal  
 4 thereby providing an enhanced position resolution relative to the first  
 5 signal.

1 15. The image optimization apparatus of claim 12, wherein the second signal  
 2 indicates successive imaging positions and reflects multiplication of the  
 3 first signal by the image size parameter, the second signal thereby scaling  
 4 image size.

- 1 16. The image optimization apparatus of claim 12, wherein the second signal  
2 is further divided by the at least one pixel prescaler.
- 1 17. The image optimization apparatus of claim 12, wherein at least one of the  
2 control unit, the drive unit, and the sensing system further comprises a  
3 digital computer.
- 1 18. A method of image processing, the method comprising the steps of:  
2 providing a plurality of raw image data files;  
3 providing a plurality of imaging devices;  
4 providing a recording medium;  
5 providing a buffer memory structure comprising at least one buffer  
6 memory pair for each raw image data file;  
7 causing relative motion between the imaging devices and the recording  
8 medium;  
9 identifying at least one pertinent segment from each of the raw image data  
10 files, the at least one pertinent segment being part of the resultant image;  
11 buffering image data corresponding to the at least one pertinent segment  
12 from each raw image data file into the at least one buffer memory pair  
13 associated with the raw image data file;  
14 copying the at least one pertinent segment from the associated at least one  
15 buffer memory pair into a resultant image buffer;  
16 generating a raw position signal indicative of the position of the imaging  
17 devices relative to the recording medium;

18 defining a resolution enhancement parameter;  
19 defining an image size parameter;  
20 defining at least one offset register;  
21 defining at least one pixel prescaler responsive to the offset register;  
22 generating an optimized position signal by multiplying the raw position  
23 signal by the resolution enhancement and the image size parameters and  
24 dividing by the at least one pixel prescaler; and  
25 activating the imaging devices during the relative motion in accordance  
26 with data in the resultant image buffer and the optimized position signal,  
27 thereby applying to the recording medium an optimized representation of  
28 the data in the resultant image buffer.

1 19. The method of claim 18, wherein the step of providing a buffer memory  
2 structure further comprises the steps of:

3 defining an imaging zone for each imaging device;  
4 determining which imaging zones are required to image each raw image  
5 data file; and  
6 providing, for each raw image data file, a buffer memory pair for each  
7 required imaging zone.

1 20. The method of claim 19, wherein the buffering step further comprises  
2 buffering image data corresponding to the at least one pertinent segment  
3 from each raw image data file into the buffer memory pair provided for  
4 each required imaging zone.



1 21. The method of claim 18, wherein the step of identifying at least one  
2 pertinent segment further comprises the steps of:  
3 ascertaining the existence of at least one overlap of a plurality of pertinent  
4 segments in the resultant image;  
5 determining for each overlap a predominating pertinent segment having  
6 precedence in the resultant image; and  
7 classifying the predominating pertinent segment as the at least one  
8 pertinent segment.

1 22. The method of claim 18, further comprising the step of permitting the at  
2 least one pertinent segment to be overwritten within the resultant image  
3 buffer by a predominating pertinent segment in accordance with an opaque  
4 ink model.

1 23. An image processing apparatus comprising:  
2 a plurality of imaging devices;  
3 a support for a recording medium;  
4 a device to provide relative motion between the imaging devices and the  
5 support;  
6 a buffer memory structure further comprising at least one buffer memory  
7 pair;  
8 a resultant image buffer;  
9 a sensing system to determine the position of the imaging devices relative  
10 to the recording medium, the sensing system further comprising a position  
11 encoder and a phase locked loop, the position encoder generating a first

- 12 signal indicative of the position, the phase locked loop responding to (i)  
13 the first signal, (ii) a resolution enhancement parameter and (iii) an image  
14 size parameter so as to generate a second signal, the second signal having  
15 a frequency determined by the resolution enhancement and image size  
16 parameters;
- 17 a control unit responsive to the sensing system and in electrical  
18 communication with the buffer memory structure and the resultant image  
19 buffer, the control unit operating so as to copy selected portions of data in  
20 the buffer memory structure into the resultant image buffer; and
- 21 a drive unit in electrical communication with the control unit, the resultant  
22 image buffer and the imaging devices, the drive unit responding to at least  
23 one pixel prescaler and operating so as to activate the imaging devices  
24 during, and at specific locations of, the relative motion, in accordance with  
25 data in the resultant image buffer, thereby applying to the recording  
26 medium an optimized representation of data in the resultant image buffer.
- 1 24. The image processing apparatus of claim 23, wherein the position encoder  
2 further comprises an angular position encoder.
- 1 25. The image processing apparatus of claim 23, wherein the second signal  
2 indicates successive imaging positions and reflects multiplication of the  
3 first signal by the resolution enhancement parameter, the second signal  
4 thereby providing an enhanced position resolution relative to the first  
5 signal.
- 1 26. The image processing apparatus of claim 23, wherein the second signal  
2 indicates successive imaging positions and reflects multiplication of the  
3 first signal by the image size parameter, the second signal thereby scaling  
4 image size.

- 1 27. The image processing apparatus of claim 23, wherein the second signal is  
2 further divided by the at least one pixel prescaler.
- 1 28. The image processing apparatus of claim 23, wherein at least one of the  
2 control unit, the drive unit, and the sensing system further comprises a  
3 digital computer.
- 1 29. An article of manufacture comprising a program storage medium having  
2 computer readable program code embodied therein for causing the  
3 compilation of image data and application of a corresponding image, the  
4 computer readable program code in the article of manufacture including:  
5 computer readable code for causing a computer to read contents of at  
6 least one raw image data file;  
7 computer readable code for causing a computer to identify at least one  
8 pertinent segment from each of the raw image data files;  
9 computer readable code for causing a computer to buffer image data  
10 corresponding to the at least one pertinent segment from each raw image  
11 data file into at least one buffer memory pair;  
12 computer readable code for causing a computer to copy the at least one  
13 pertinent segment from the at least one buffer memory pair into a resultant  
14 image buffer; and  
15 computer readable code for causing a computer to activate a plurality of  
16 imaging devices in accordance with data in the resultant image buffer, so  
17 as to achieve application of the corresponding image.
- 1 30. A program storage medium readable by a computer, tangibly embodying a  
2 program of instructions executable by the computer to perform method

- 3 steps for the compilation of image data and application of a corresponding  
4 image, the method steps comprising:
- 5 reading the contents of at least one raw image data file;
- 6 identifying at least one pertinent segment from each of the raw image data  
7 files;
- 8 buffering image data corresponding to the at least one pertinent segment  
9 from each raw image data file into at least one buffer memory pair;
- 10 copying the at least one pertinent segment from the at least one buffer  
11 memory pair into a resultant image buffer; and
- 12 activating a plurality of imaging devices in accordance with data in the  
13 resultant image buffer, so as to achieve application of the corresponding  
14 image.
- 1 31. An article of manufacture comprising a program storage medium having  
2 computer readable program code embodied therein for causing the  
3 optimized application of image data, the computer readable program code  
4 in the article of manufacture including:
- 5 computer readable code for causing a computer to generate a raw position  
6 signal;
- 7 computer readable code for causing a computer to define a resolution  
8 enhancement parameter;
- 9 computer readable code for causing a computer to define an image size  
10 parameter;

- 11 computer readable code for causing a computer to define at least one  
12 offset register;
- 13 computer readable code for causing a computer to define at least one pixel  
14 prescaler responsive to the at least one offset register;
- 15 computer readable code for causing a computer to define an optimized  
16 position signal by multiplying the raw position signal by the resolution  
17 enhancement and the image size parameters and dividing by the at least  
18 one pixel prescaler; and
- 19 computer readable code for causing a computer to activate a plurality of  
20 imaging devices in accordance with the optimized position signal and the  
21 image data, so as to achieve optimized application of the image  
22 corresponding to the image data.
- 1 32. A program storage medium readable by a computer, tangibly embodying a  
2 program of instructions executable by the computer to perform method  
3 steps for the optimized an application of image data, the method steps  
4 comprising:
- 5 generating a raw position signal;
- 6 defining a resolution enhancement parameter;
- 7 defining an image size parameter;
- 8 defining at least one offset register;
- 9 defining at least one pixel prescaler responsive to the at least one offset  
10 register;

11 generating an optimized position signal by multiplying the raw position  
12 signal by the resolution enhancement and the image size parameters and  
13 dividing by the at least one pixel prescaler; and  
  
14 activating a plurality of imaging devices in accordance with the optimized  
15 position signal and the image data, so as to achieve optimized application  
16 of the image corresponding to the image data.

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